

Case 3412***Reticulitermes* Holmgren, 1913 (Insecta, Isoptera): proposed precedence over *Maresa* Giebel, 1856**

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Abstract. The purpose of this application, under Article 23.9.3 of the Code, is to conserve the usage of the genus-group name *Reticulitermes* Holmgren, 1913 (type species *Termes flavipes* Kollar, 1837) for an economically important and universally known group of subterranean termites responsible for much economic damage in the Northern Hemisphere. Two genus-group names have priority over *Reticulitermes*, both having been established for a common species of fossil termite in Baltic amber. *Hemerobites* Germar, 1813 (type species *Hemerobites antiquus* Germar, 1813) has not been used after 1899 and can be considered a nomen oblitum under Article 23.9.1 of the Code. *Maresa* Giebel, 1856 (type species *Maresa plebeja* Giebel, 1856) has been used once since 1899, in a large compendium on fossil insects. and, therefore, cannot be automatically considered a nomen oblitum. It is proposed that the genus-group name *Reticulitermes* be given precedence over *Maresa*.

Keywords. Nomenclature; taxonomy; Isoptera; *Reticulitermes*; *Maresa*; *Hemerobites*; *Reticulitermes flavipes*; *Maresa plebeja*; termites; fossil; Baltic amber; Eocene.

1. Germar (1813, p. 16) established the nominal genus *Hemerobites* in a paper on Baltic amber insects (middle Eocene (Lutetian)). A single species was included, *Hemerobites antiquus* Germar, 1813. *Hemerobites antiquus* was recognized to be a termite and transferred to *Termes* Linnaeus, 1758 by Hagen (1854, p. 222) and eventually to *Reticulitermes* Holmgren, 1913 by Rosen (1913, p. 331). The last usage of *Hemerobites* as a valid genus-group name was by Schlechtendal (1888, p. 489).

2. In a general work on the fossils of Germany Giebel (1856, p. 298) established the genus *Maresa* for what he believed to be a new fossil species of termite in Baltic amber. The type species of *Maresa* is *Maresa plebeja* Giebel, 1856 by monotypy. *Maresa* was synonymized with *Termes* Linnaeus, 1758 by Hagen (1858, p. 181) and was subsequently used only as a valid genus-group name by Handlirsch (1907, p. 700), who synonymized *Maresa plebeja* Giebel, 1856 with *Termes fossile* Ouchakoff, 1838.

3. In his monumental monograph on the systematics of termites Holmgren (1913, pp. 60–61) established the nominal genus *Reticulitermes* as a subgenus of *Leucotermes* Silvestri, 1901 for *Termes flavipes* Kollar, 1837 (p. 411) and related species. *Termes flavipes* was fixed as type species by original designation. Although the name *T. flavipes* was previously used in an 1833 report of a society meeting, no description or figures, nor indication of a description or figures, was provided and the name was a nomen nudum at that time (Anonymous, 1833, col. 459).

4. Both generic names *Hemerobites* and *Maresa* have priority over *Reticulitermes* by 100 and 57 years, respectively. As noted, *Hemerobites* has not been used since 1888 while the junior synonym has been used in more than 50 articles by more than 10 authors during the last 50 years. Accordingly, *Hemerobites* can be automatically considered a nomen oblitum under Article 23.9.1. *Maresa plebeja* was recognized as a synonym of *Hemerobites antiquus* by Hagen (1858, p. 180) and was not used by authors after Giebel (1856) except when temporarily resurrected as a valid generic name by Handlirsch (1907, p. 700) for *T. fossile*. The name was not used again by any subsequent authors. While *Reticulitermes* has been universally used during the last century for *T. flavipes* and its relatives, including the fossil *T. antiquus*, *Maresa* has priority and cannot be automatically considered a nomen oblitum under Article 23.9.1 of the Code owing to Handlirsch's usage of the name.

5. To revert to *Maresa* in place of its junior synonym *Reticulitermes* would bring about a change in name for a group of widely-encountered and economically important pest species. As noted, no author subsequent to Handlirsch (1907) has employed *Maresa* as a valid genus-group name, and *Reticulitermes* has been universally used as the valid name in hundreds of works published by dozens of authors subsequent to Handlirsch. Such works include systematic treatments (e.g. Snyder, 1949; Emerson, 1971; Roonwal, 1983; Nel & Paicheler, 1993; Sands, 1998; Takematsu, 1999; Luchetti et al., 2004; Austin et al., 2006; Heintschel et al., 2006; Maiti, 2006; Nobre et al., 2006) as well as biological and behavioral studies (e.g. Chhotani & Bose, 1979; Prestwich, 1983, 1984, 1985; Matsuura, 2001; Nelson et al., 2001; Laine & Wright, 2003; Arquette & Forschler, 2006), work on protozoan symbionts (e.g. Brugerolle & Bordereau, 2006), and biological control investigations (e.g. Cornelius & Ostbrink, 2001; Peterson & Ems, 2003; Swoboda et al., 2004; Nakayama et al., 2004; Bernklau et al., 2005; Arquette et al., 2006). It is proposed that the genus-group name *Reticulitermes* be given precedence over *Maresa*.

6. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to rule that the generic name *Reticulitermes* Holmgren, 1913 is to be given precedence over *Maresa* Giebel, 1856 whenever their type species are placed in the same genus-group taxon;
- (2) to place on the Official List of Generic Names in Zoology the following names:
 - (a) *Reticulitermes* Holmgren, 1913 (gender: masculine), type species by original designation *Termes flavipes* Kollar, 1837, with the endorsement that it is to be given priority over the name *Maresa* Giebel, 1856 whenever their type species are placed in the same genus-group taxon;
 - (b) *Maresa* Giebel, 1856 (gender: feminine), type species by monotypy *Maresa plebeja* Giebel, 1856, with the endorsement that it is not to be given priority over the name *Reticulitermes* Holmgren, 1913 whenever their type species are placed in the same genus-group taxon;

- (3) to place on the Official List of Specific Names in Zoology the following names:
- (a) *flavipes* Kollar, 1837, as published in the binomen *Termes flavipes* (specific name of the type species of *Reticulitermes* Holmgren, 1913);
 - (b) *plebeja* Giebel, 1856, as published in the binomen *Maresa plebeja* (specific name of the type species of *Maresa* Giebel, 1856).

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References

- Anonymous.** 1833. Versammlung Naturforscher und Ärzte in Wien. *Isis*, **26**(4–6): 288–580.
- Arquette, T.J. & Forschler, B.T.** 2006. Survey of metabolic reserves, stored uric acid, and water content from field populations of subterranean termites (Isoptera: Rhinotermitidae) from Georgia. *Journal of Economic Entomology*, **99**(3): 873–878.
- Arquette, T.J., Champagne, D.E., Brown, M.R. & Forschler, B.T.** 2006. Evaluation of novel and traditional measures for vigor of laboratory-cultured termites, *Reticulitermes flavipes* (Kollar). *Journal of Insect Physiology*, **52**(1): 51–66.
- Austin, J.W., Szalanski, A.L., Ghayourfar, R., Kence, A. & Gold, R.E.** 2006. Phylogeny and genetic variation of *Reticulitermes* (Isoptera: Rhinotermitidae) from the eastern Mediterranean and Middle East. *Sociobiology*, **47**(3): 873–890.
- Bernklau, E.J., Fromm, E.A., Judd, T.M. & Bjostad, L.B.** 2005. Attraction of subterranean termites (Isoptera) to carbon dioxide. *Journal of Economic Entomology*, **98**(2): 476–484.
- Brugerolle, G. & Bordereau, C.** 2006. Immunological and ultrastructural characterization of spirotrichonymphid flagellates from *Reticulitermes grassei* and *R. flavipes* (syn. *R. santonensis*), with special reference to Spirotrichonympha, *Spironympha* and *Microjoenia*. *Organisms, Diversity and Evolution*, **6**(2): 109–123.
- Chhotani, O.B. & Bose, G.** 1979. Nesting behaviour and nests of Indian termites. *Zoologiana*, **2**: 16–28.
- Cornelius, M.L. & Ostbrink, W.L.A.** 2001. Tunneling behavior, foraging tenacity, and wood consumption rates of Formosan and eastern subterranean termites (Isoptera: Rhinotermitidae) in laboratory assays. *Sociobiology*, **37**(1): 79–94.
- Emerson, A.E.** 1971. Tertiary fossil species of the Rhinotermitidae (Isoptera), phylogeny of genera, and reciprocal phylogeny of associated Flagellata (Protozoa) and the Staphylinidae (Coleoptera). *Bulletin of the American Museum of Natural History*, **146**(3): 243–303.
- Germar, G.F.** 1813. Insecten in Bernstein eingeschlossen, beschrieben aus dem academischen Mineralien-Cabinet zu Halle. *Magazin der Entomologie*, **1**: 11–18.
- Giebel, C.G.** 1856. *Fauna der Vorwelt [vol. 2]: Die Insekten und Spinnen der Vorwelt mit Steter Berücksichtigung der Lebenden Insekten und Spinnen*. xviii, 511 pp. F.U. Brockhaus, Leipzig.
- Hagen, H.** 1858. Monographie der Termiten. *Linnaea Entomologica*, **12**: 1–342.
- Handlirsch, A.** 1907. *Die Fossilen Insekten und die Phylogenie der rezenten Formen: Ein Handbuch für Paläontologen und Zoologen*. 641–1120 pp. Engelmann, Leipzig.
- Heintschel, B.P., Austin, J.W. & Gold, R.E.** 2006. Soldier labral morphology and genetic comparisons of *Reticulitermes* (Isoptera: Rhinotermitidae) from Texas. *Sociobiology*, **48**(1): 63–84.
- Holmgren, N.** 1913. Termitenstudien. 4. Versuch einer systematischen Monographie der Termiten der orientalischen Region. *Kungliga Svenska Vetenskaps-Akademiens Handlingar*, **50**(2): 1–276.

- Kollar, V.** 1837. *Naturgeschichte der schädlichen Insekten in Beziehung auf Landwirthschaft und Forstcultur*, &c. viii, 421 pp. Ferdinand Ullrich, Wien.
- Laine, L.V. & Wright, D.J.** 2003. The life cycle of *Reticulitermes* spp. (Isoptera: Rhinotermitidae): What do we know? *Bulletin of Entomological Research*, **93**(4): 267–278.
- Linnaeus, C.** 1758. *Systema Naturae*, Ed. 10, vol. 1. 824 pp. Salvii, Holmiae.
- Luchetti, A., Trenta, M., Mantovani, B. & Marini, M.** 2004. Taxonomy and phylogeny of north Mediterranean *Reticulitermes* termites (Isoptera: Rhinotermitidae): A new insight. *Insectes Sociaux*, **51**: 117–122.
- Maiti, P.K.** 2006. A taxonomic monograph on the world species of termites of the family Rhinotermitidae (Isoptera: Insecta). *Memoirs of the Zoological Survey of India*, **20**(4): 1–272.
- Matsuura, K.** 2001. Nestmate recognition mediated by intestinal bacteria in a termite, *Reticulitermes speratus*. *Oikos*, **92**(1): 20–26.
- Nakayama, T., Yoshimura, T. & Imamura, Y.** 2004. Recovery of Japanese subterranean termites, *Reticulitermes speratus* and *Coptotermes formosanus*, (Isoptera: Rhinotermitidae), from desiccation treatment. *Sociobiology*, **43**(3): 489–499.
- Nel, A. & Paicheler, J.-C.** 1993. Les Isoptera fossiles. État actuel des connaissances, implications paléoécologiques et paléoclimatologiques (Insecta, Dictyoptera). *Cahiers de Paléontologie*, **1993**: 101–179.
- Nelson, L.J., Cool, L.G., Forschler, B.T. & Haverty, M.I.** 2001. Correspondence of soldier defense secretion mixtures with cuticular hydrocarbon phenotypes for chemotaxonomy of the termite genus *Reticulitermes* in North America. *Journal of Chemical Ecology*, **27**(7): 1449–1479.
- Nobre, T., Nunes, L., Eggleton, P. & Bignell, D.E.** 2006. Distribution and genetic variation of *Reticulitermes* (Isoptera: Rhinotermitidae) in Portugal. *Heredity*, **96**(5): 403–409.
- Ouchakoff, N.** 1838. Notice sur un *Termes* fossile. *Bulletin de la Société Imperiale des Naturalistes de Moscou*, **11**: 37–42.
- Peterson, C.J. & Ems, W.J.** 2003. Catnip essential oil as a barrier to subterranean termites (Isoptera: Rhinotermitidae) in the laboratory. *Journal of Economic Entomology*, **96**(4): 1275–1282.
- Prestwich, G.D.** 1983. Chemical systematics of termite exocrine secretions. *Annual Review of Ecology and Systematics*, **14**: 287–311.
- Prestwich, G.D.** 1984. Defense mechanisms of termites. *Annual Review of Entomology*, **29**: 201–232.
- Prestwich, G.D.** 1985. Communication in insects, II. Molecular communication of insects. *Quarterly Review of Biology*, **60**(4): 437–456.
- Roonwal, M.L.** 1983. Evolution and systematic significance of wing micro-sculpturing in termites. XIII. Order Isoptera. *Proceedings of the Indian National Science Academy, Series B*, **49**(5): 359–391.
- Rosen, K., von.** 1913. Die fossilen Termiten: Eine kurze Zusammenfassung der bis jetzt bekannten Funde. *Transactions of the Second International Congress of Entomology, Oxford 1912*, **2**: 318–335, 6pls.
- Sands, W.A.** 1998. *The Identification of Worker Castes of Termite Genera from Soils of Africa and the Middle East*. vii, 500 pp. CAB International, Oxon.
- Schlechtendal, D.[H.R.], von.** 1888. Mittheilungen über die in der Sammlung aufbewahrten Originale zu Germar's: "Insekten in Bernstein eingeschlossen" mit Rücksicht auf Giebels "Fauna der Vorwelt". *Zeitschrift für [die Gesammten] Naturwissenschaften*, **61**: 473–491.
- Silvestri, F.** 1901. Nota preliminare sui Termitidi sud-americani. *Bollettino dei Musei di Zoologia ed Anatomia Comparata della Reale Università di Torino*, **16**(389): 1–8.
- Snyder, T.E.** 1949. Catalog of the termites (Isoptera) of the world. *Smithsonian Miscellaneous Collections*, **112**: 1–490.
- Swoboda, L.E., Miller, D.M., Fell, R.J. & Mullins, D.E.** 2004. The effect of nutrient compounds (sugars and amino-acids) on bait consumption by *Reticulitermes* spp. (Isoptera: Rhinotermitidae). *Sociobiology*, **44**(3): 547–563.

Takematsu, Y. 1999. The genus *Reticulitermes* (Isoptera: Rhinotermitidae) in Japan, with description of a new species. *Entomological Science*, **2**(2): 231–243. .

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